Symons's
Meteorological Magazine.

No. 601. FEBRUARY, 1916. Vol. LI.

OUR FIFTY-FIRST VOLUME.

The month which sees the closing of museums as a measure of war economy is surely inauspicious for the commencement of the second half-century of a scientific journal. Did we see any possibility of contributing in the minutest degree to the speedy victory of the Allies we should, of course, not hesitate for a moment to sacrifice this Magazine. As a matter of fact the production of this Magazine keeps no one fit for more useful work from the service of the country, and we believe that its continuance is in a small way useful now and will prove more useful still in future years. In some departments of science no harm would result, and good might even accrue from the temporary cessation of observations and records; but in the study of climate it is necessary to maintain the chain unbroken, for it is essential to know what variations from a normal course are possible in every season. Records have not yet been carried on so long that we can say that past observations suffice to show what the greatest future variations will be. Had all meteorological observations in these islands ceased at the outbreak of the war we should have passed unnoticed the unprecedented wetness of two consecutive Decembers in parts of the south of England, the unprecedented intensity of twenty-four hours' rainfall in the north-east of Scotland, the unprecedented cold of November, and the unprecedented warmth of January in several places. All these phenomena approach to limiting values, and are not merely matters of curious interest. Continuity in rainfall observations is more important to the welfare of the nation than most people suspect. The rainfall which can be relied upon for water-supply for any given area can, as a rule, only be computed by the use of long continuous records, not necessarily kept on the ground in question. In the near future when water-supply will probably cease to be a municipal and become a national responsibility, the continuity of observations may mean a saving of millions of pounds in the cost of water at a time when a million pounds will be a far more formidable sum than it was before the war.

Apart from encouraging continuity in observations, we hope that our fifty-first volume will help in a greater degree than its predecessors to bring home to our readers the unity of the Empire and the vast diversity of its climate. In this number we publish an important contribution from Australia, and at an early date expect to print a report of a remarkable rain-storm in Malta, while last month we gave an illustrated account of intense rainfall in Ceylon. Since the commencement of the war various interesting communications from neutral countries have appeared in our pages, and we have pleasure in stating that the annual meteorological summaries of the observations taken by Belgian missionaries at the observatory of Zi-ka-wei, near Shanghai, which have hitherto appeared in a German publication, will henceforth be printed in our pages. We much regret that at a time when the opportunity of widening our scope presents itself in various directions, it is necessary to continue the restricted size of the last year, but the increase in the cost of production (which necessitates the numbers of this volume appearing in a white instead of a blue cover) and the natural cessation of the growth in circulation require this. We look forward to the close of the war as an opportunity for expansion which will justify all the trouble of holding on through present difficulties.

ROYAL METEOROLOGICAL SOCIETY.

THE Annual General Meeting of the Society was held on January 19th, at the Surveyors' Institution, Westminster, Major H. G. Lyons, F.R.S., President, in the Chair.

The Council's report for the year 1915 was submitted and a resolution passed for its adoption. The year of national emergency had proved one of difficulty and there was a decrease in the number of Fellows; but, when the exceptional circumstances were taken into account, this could not be regarded as excessive.

By an alteration in Bye-law 14, it was resolved that the Council should have powers to remit the annual contributions of Fellows, provided that the number so remitted should at no time exceed five. The Symons Gold Medal was awarded by the Society to Prof. Alfred Angot, the Director of the Bureau Central Météorologique de France, in consideration of his distinguished work in Meteorological Science.

The following were elected to serve on the Council for the 1916 Session. *President,:* Major H. G. Lyons, D.Sc., F.R.S.; *Vice-Presidents :* Capt. C. J. P. Cave, M.A., Mr. R. H. Hooker, M.A., Mr. Baldwin Latham, C.E., Mr. Carle Salter; *Treasurer :* Mr. F. Druce; *Secretaries :* Mr. W. W. Bryant, Mr. W. Sedgwick;

Foreign Secretary : Dr. R. H. Scott, F.R.S. ; *Councillors :* Mr. H. B. Adams, Mr. C. E. P. Brooks, Dr. C. Chree, Mr. J. E. Clark, Dr. H. N. Dickson, Mr. J. S. Dines, Mr. W. H. Dines, F.R.S., Major E. Gold, D.S.O., Mr. A. P. Jenkin, Mr. R. G. K. Lempfert, Lt.-Col. H. Mellish, Col. H. E. Rawson, C.B.

The President gave an address on "Winter Climate of the Eastern Mediterranean." Taking into consideration the special interest in the Eastern Mediterranean at the present time, it was important to study the climatic conditions obtaining there and influencing the allied operations, both naval and military. Meteorological observations and problems had no longer merely theoretical but practical value, and Major Lyons took this opportunity of congratulating Major E. Gold whose services with the Meteorological Staff of the army had been recognised by the award of the D.S.O. The general weather characteristics of the Eastern Mediterranean ranged from the rigorous continental type met with in the high plateau of the Balkan States to the uniform Mediterranean type in Southern Greece and the Levant and the subtropical climate of Egypt.

In the Balkan peninsula temperatures of 0° Fahr. had frequently been recorded on the high plateau up to the month of March, and it was only when nearing the Aegean Sea that there was a mean temperature above 32° Fahr. for all the winter months. Associated with the continental type the monthly precipitation was comparatively uniform, taking the form rather of heavy showers than of continuous rain ; but in the coastal regions the winter months had heavy rainfall. In Egypt the rainfall of the winter months was insignificant. Snowfall had been recorded as far south as Athens, but even at Salonica the days with snow were few. Inland the number of days increased to about one-third of the days with precipitation in the Bulgarian Hills. Severe conditions, however, occurred occasionally at Salonica, where in 1903 the sea was frozen for two days to a thickness of 1 cm. In regard to the gales which had been so frequently experienced recently in the Aegean Sea, those from the south-west did not appear to have been common in past years, but might be considered generally as the result of cyclones passing over the north of the Balkan Peninsula or approaching the west of Greece. Such were normally of short duration, seldom lasting above one or two days. The normal winter pressure distribution, however, with anticyclonic conditions over Russia extending to the Balkan plateau, favoured a gravitational flow of cold air from the north ; and when associated with marked cyclonic conditions in the south, northerly gales held for 4, 5 or 6 days.

Dr. Dickson proposed a vote of thanks to the President for his duties during the past year and for his address.

The following were elected fellows of the Society :—Mr. P. Berryman, Mr. B. Lall Chawla, Mr. R. K. Nehra, and Mr. M. Po Thet.

TEMPERATURE DEPARTURES IN AUSTRALIA, 1915.

By H. A. HUNT, Commonwealth Meteorologist.

THE accompanying notes and temperature charts on the remarkably warm winter and greater part of the year 1915 in Australia, may be of special interest in view of the very cold Argentine winter,

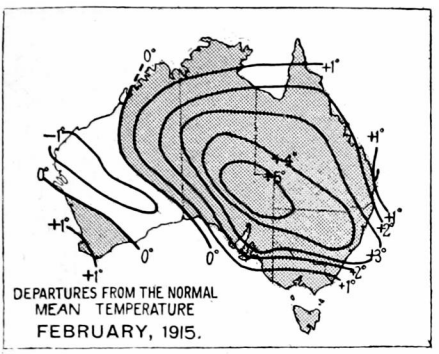
The unusual warmth at most of the representative stations in the Commonwealth was especially noticeable in June and July when every one of them recorded a mean temperature above its previous average, the departure being greateet, above 5°, over Central Australia. It is perhaps worthy of note that the tendency throughout the year was for the excess temperatures to be located over the centre of the continent, the northern and north-eastern halves being almost continuously warmer than usual except in May and August, when departures were very slight everywhere. During February, March, and April, a marked tendency to lowered temperatures was shown in a belt lying north-west and south-east over West Australia and during the last two months extending over south-eastern areas also.

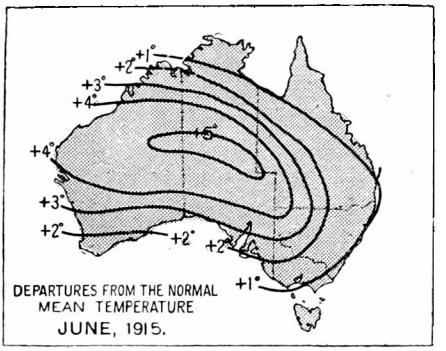
Perhaps more significant still is the distribution of the + and — departures from mean minimum temperature. Radiation being so active under the dry and usually cloudless atmosphere of inland areas of the continent, any marked departure from the normal would be mainly governed by variations in the moisture content, whether shown as cloud or in an increased humidity of the lower levels. Should these affect large areas and show definite tendencies to progressive movement it might be possible to obtain some indication from them of the general atmospheric currents tending towards rain production or in the reverse way. For February, March and April the distribution and amount of the + and — departures is much the same as those of the mean temperatures, but in May increased cloudiness or humidity was able over the greater part of the continent and especially in the western half to increase the + departure considerably at Onslow and Lawlers, these excesses being greater than 7°, a very large amount. In June the + centre was thrown further west, and in July the + departures were increased generally, which was quite in harmony with the increased rainfall of these months.

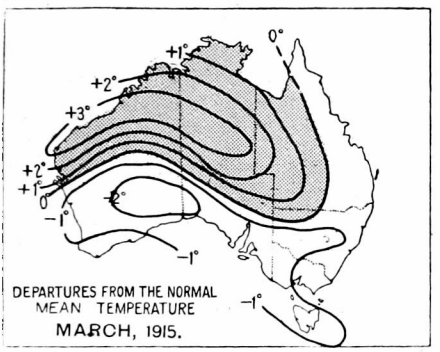
With regard to progressive movements of these temperature departure areas, not much is obvious from the maps except the general tendency for the centres of the departure areas to cling to the tropic, but the subject is well worth further study.

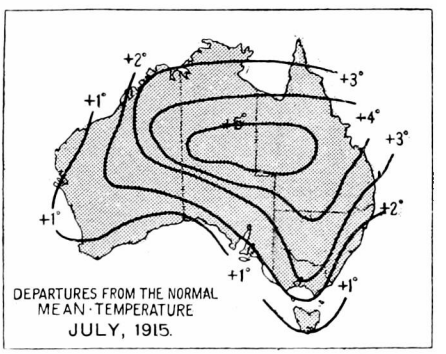
If it is possible to obtain similar data from South Africa some light may be thrown on the temperature distribution during the period over the southern hemisphere.

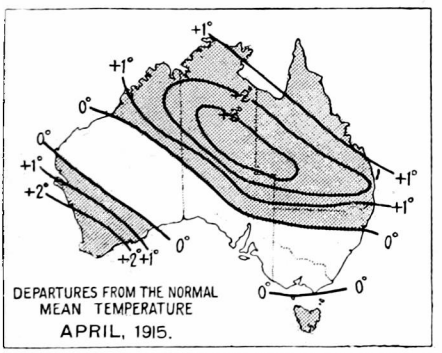
One would naturally have expected a decided indraft of ocean winds in response to unusual continental heat, but curiously enough over Southern Australia there has been an extraordinary prevalence of northerly winds, and very few with a southerly component.

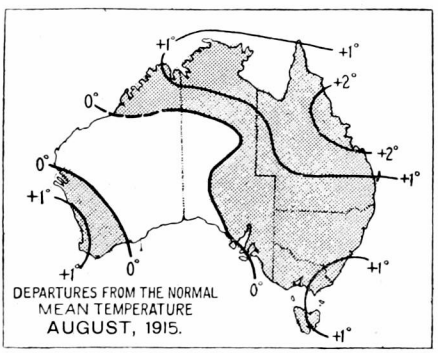


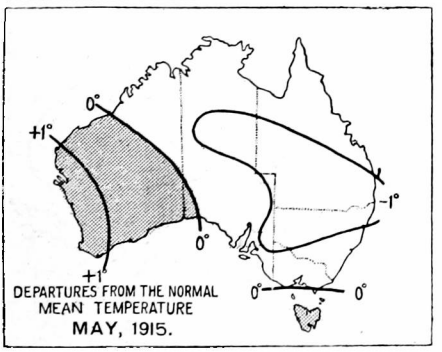


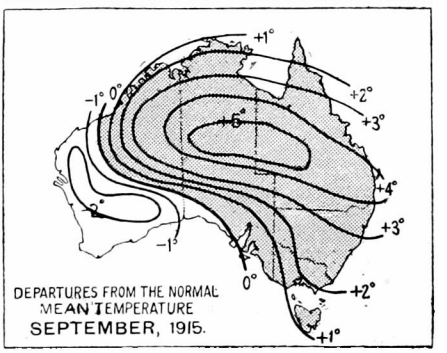




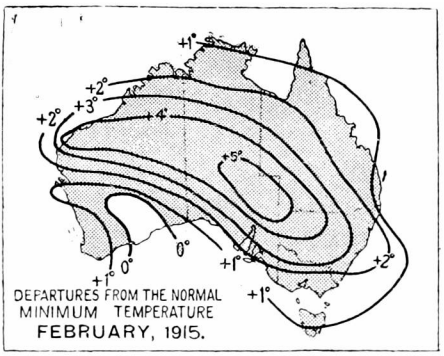


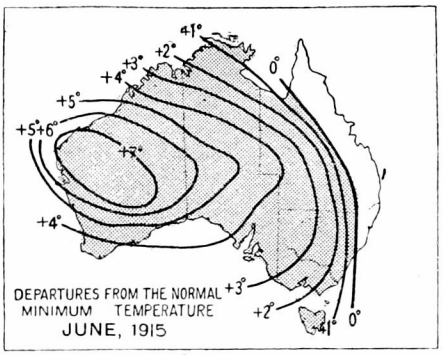


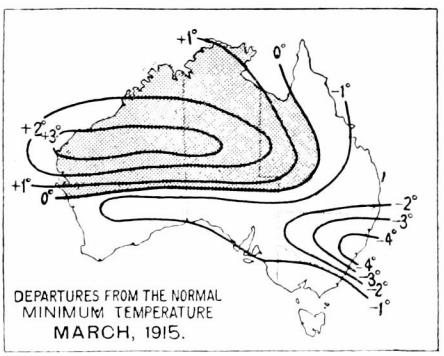


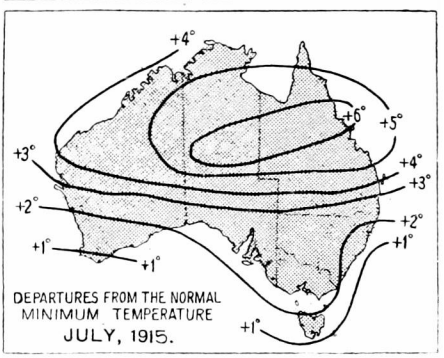


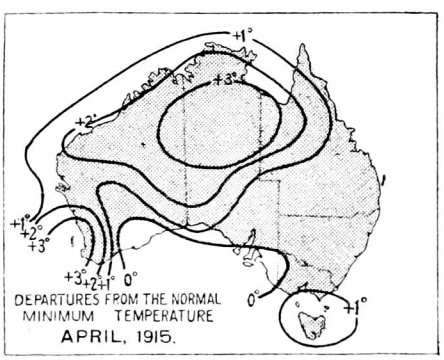
The shaded areas are above the average

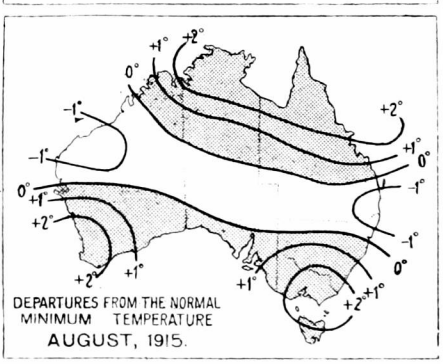


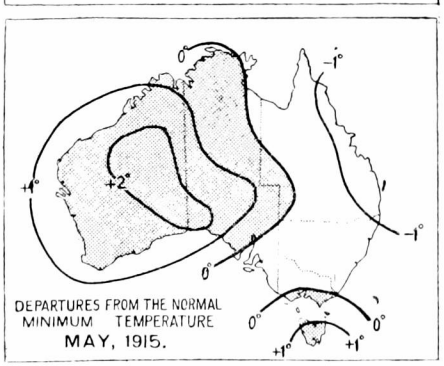


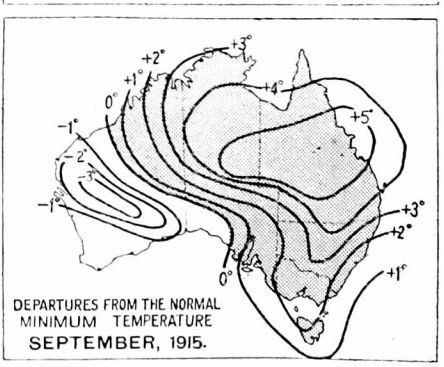












The shaded areas are above the average

THE MILDNESS OF JANUARY, 1916, IN LONDON.

THE mean shade temperature of January for the 50 years, 1860—1909, is 38°·5. Only one day in January, 1916, had a mean temperature so low as the average for the month, viz.. the 14th, with 37°·8. No fewer than five had a mean temperature above 50°, and of these the highest reading, *52°·1*, occurred on the 1st. On that day the maximum temperature rose to *57°·2*, the highest shade temperature observed in January during the whole period from 1858 to the present time. It is extremely rare for so high a figure to be reached in either December or February. The maximum temperature fell below 45° on only one day, the 31st, when it was *44°·0*. Only two Januaries in the record failed to record at least one maximum below 40°, the highest value in the list being 40°·4 in 1874. The mean maximum temperature in January, 1916, was *50°·7*, or *7°·1* above the average, and 1°·8 higher than the highest previously observed, 48°·9 in 1890. The shade minimum temperatures were no less remarkable, the mean value, *40°·7*, being *6°·9* above the average, and 0°·9 higher than the previous record of 39°·8 in 1898. January, 1916, was thus the only January with a mean minimum so high as 40°. Since 1858 no February or March and only two Decembers had had so high a mean minimum as January, 1916, whilst 39 Aprils and 48 Novembers in the 58 years have also shown lower values. The highest minimum reading 50°·2 on the 22nd, had, however, been exceeded 7 times in January. The highest minimum reading ever observed for the month was 52°·3 on the 1st, 1860. The lowest shade temperature touched in January, 1916, was 30°·2. One January only, in 1884, failed to record so low a reading, its minimum having been 32°·2.

The temperature readings for the month are summed up in the mean value of *45°·7*. This is *7°·2* above the average and exceeds by 1°·8 the next highest value, 43°·9, which occurred in 1884. The temperature of January, 1916, exceeded the average value for any month from November to March inclusive, and comparatively few individual months even in this extended period were milder. There were indeed several years in which April, and one or two in which October, had a lower mean temperature.

It should perhaps be observed that the whole of the temperature records referred to were taken on an open Glaisher screen. When compared with the standard Stevenson screen readings, observations on the open screen frequently show rather higher values in the summer and rather lower in the winter, on account of radiation. In a cloudy and mild winter month such as January, 1916, the differences are not as a rule important, and the mean maxima actually differed by only 0°·1. The mean minimum in the Stevenson screen was, however, 41°·9, or 1°·2 higher than that in the Glaisher screen.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE EXTRAORDINARY WARMTH OF JANUARY, 1916.

THERE can be little doubt that January, 1916, has been the warmest on record. Here not a single fleeting spell of cold lowered the month's exceptional figures, even the coldest day having a maximum of 44°. As a result the averages of the month are extraordinary. The mean temperature was 44°·3, and every single January, February, March and December in the last 16 years had a lower mean, while nine Aprils in the same period were also colder. Comparing it with the autumn months back to 1900, two Octobers and fifteen Novembers were colder. The mean maximum temperature was 49°·5, which is higher than any mean maximum since 1900 in January, February or December. The mean minimum was as high as 39°·1 and, not to mention the *winter* months, seven Mays and all the Aprils except one in the last sixteen years had lower night temperatures. There were only three frosts, even by an unscreened instrument, the minimum being 25°.

A comparison between January and last November shows the extraordinary contrast between these two months.

	Mean Temp.	Mean Min.	Mean Max.	Frosts.
November, 1915 ...	33°·1 ...	24°·5 ...	41°·6 ...	23
January, 1916 ...	44°·3 ...	39°·1 ...	49°·5 ..	3

In the third week of the month a standard Jargonelle pear in an orchard was in bud, and on the 30th the buds had burst, showing the folded blossom; elms are of a ruddy brown usually associated with mid-March or later. On the 30th a dish of rhubarb, completely unprotected, could be had from the garden. On the nearest (northerly) ridge of the Black Mountains no snow was to be seen at any time in the month, even at 2,300 ft., while on May 13th last year there was an average depth of a foot, and five to six feet in drifts on the same spot. R. P. DANSEY.

Kentchurch Rectory, Hereferd, February 1st, 1916.

OUR figures respecting the high temperature of January may interest you, we are in the north of England and 480 feet above the sea.

	Mean min.	Mean max.	Mean temp.
Jan., 1916	39°·1 ...	48°·4 ...	43°·8
Previous highest, 1898	38°·1 ...	47°·9 ...	43°·0
Average 28 years ...	— ...	— ...	36°·4

Coldest night, 13th, 28°·0.
Warmest day (shade) 6th, 55°·0 (1st, 54°·0).

I have a newspaper cutting in my book against January, 1898, which says—

"Mr. R. C. Mossman of Edinburgh writes to the *Scotsman*, that the weather records for the city extend back to 1764—and in no year was the temperature of January as high as in 1898—January 1898 was 44°·6, and the only year at all approaching this was 1796 (43°·8)."

And yet January, 1916 is warmer than 1898 here.

A. R. CROSSLEY.

Falling Royd, Hebden Bridge, February 4th, 1916.

THE following figures regarding the screen temperature of January last may be of interest :—

Barnstaple.	Mean Shade Temp.	Jan., 1916	49·0
	,, ,, ,, ...	Average	41·7
	,, Max. ,, ...	Jan., 1916	51·6
	,, Min. ,, ...	,, ,,	46·3
	Absolute Max. Temp....	,, ,,	57·0 on 1st.
	,, Min. ,, ...	,, ,,	33·0 on 14th.

	Maxima.	Minimum.
Torrington.....	50 on 1st	29 on 23rd
Braunton	52 ,, 4th	35 ,, 23rd
Horwood	55 ,, 1st	33 ,, 22nd
Morthoe	54 ,, 1st	38 ,, 24th
Northam	56 ,, 1st	33 ,, 22nd
Chulmleigh	55 ,, 29th	34 ,, 25th
Woolacombe.....	56 ,, 1st	38 ,, 23rd
Landcross	57 ,, 1st	32 ,, 23rd
Lynton	54 ,, 1st	37 ,, 22nd
Heanton Punchardon	57 ,, 1st	36 ,, 23rd
Pilton	58 ,, 1st	34 ,, 23rd
Castle Hill..	53 ,,17th	29 ,, 27th
Ilfracombe.....	55 ,, 1st	38 ,, 25th

THOS. WAINWRIGHT.

North Devon Athenæum, Barnstaple, Feb. 1st, 1916.

DECEMBER RAINS.—RECENT TEMPERATURES.

ANOTHER wet December in this locality yielded more than seven inches of rain, distributed over twenty-seven days.

Great irregularities in the amount of downpour are of such common occurrence that it may appear a mere superfluity to adduce recent instances. As affecting the questionable utility of short averages I may, however, be pardoned if I mention that six of the last seven Decembers have yielded very excessive rainfall, the figures being as follows, as given for Clifton (in the January number of *Symons's Meteorological Magazine*), and furnished by the late Mr. R. F. Sturge, or from his residence :—

Year.	Depth. inches.	Diff. from Aver. inches.	Year.	Depth. inches.	Diff. from Aver. inches.
1909	5·25	+2·25	1913	2·18	— ·82
1910	5·77	+2·77	1914	7·17	+4·17
1911	7·34	+4·34	1915	7·18	+4·18
1912	6·57	+3·57			

The average for December is about three inches. While the last month of the year has been recently increasing its average, September has exhibited a remarkable deficiency, the aggregate for the last ten years having been less than half the normal fall.

January, 1916, has had a mean temperature of 45°·9, and has furnished one of the mildest periods on record for that month, maximum in shade, 57° on 2nd. The figures from observations here during the last three months are curious, viz. :—

	Mean Temp.	Greenwich Average.
	°	°
November, 1915	38·5	43·5
December, 1915	43·2	39·9
January, 1916	45·9	38·6

The temperatures observed would apply better to the usual readings in February, March and April, than to the months in which they actually occurred. W. F. DENNING.

Horfield, Bristol, February 1st, 1916.

LUNAR RAINBOW AND TRIPLE RED SUNSET.

A REMARKABLE lunar rainbow was observed at Bridgwater on January 19th, 1916, between 6 and 7 p.m. The arch was complete during almost an hour, and the outer bow was faintly visible at times, also a fair amount of colour. It was formed on driving misty rain from the sea, almost without clouds. Nearly the whole sky was fairly clear so that the planets and brighter stars were visible in the strong moonlight. During 45 years' observation of such phenomena I have recorded only four or five lunar rainbows, and certainly never saw such a beautiful example of this ghostly object. The rain and clouds increased later, and then it became clearer, but about 9 next morning a rather severe thunder squall came up the Channel, one peal was heard at Bridgwater, and a good many at Burnham, where also hail fell.

The red sunset of January 10th was curious for the long time it lasted and its recrudescence. Immediately after sunset there was a brilliant lighting up of low cumulus with orange light against a green background. After this faded there was a pink light on clouds of cirrus type, and finally ranges of cumulo-stratus glowed dully from reflected light from below the horizon until the moon and stars were shining on an almost dark sky about six o'clock.

HENRY CORDER.

Bridgwater.

A PARTIAL RAIN SPELL.

I AM very grateful to Mr. Hopkinson for his letter pointing out the inadequacy of my definition of a partial rain spell, and thoroughly approve of his suggestion for defining one. My letter was written more with the object of calling attention to the need of such a definition, than of proposing an actual definition.

A. E. SWINTON.

Swinton House, Duns, Berwickshire, Jan. 31st, 1916.

REVIEW.

Memoirs of the Colombo Observatory. No. 1. *On the Intensity of Rainfall experienced in Ceylon.* No. 2. *Summary of Barometric Observations, 1870-1913.* By A. J. BAMFORD, B.Sc., B.A. Colombo, 1914. Size, 13 × 8. Pp. 7 and 8. Plates. Price 50 cents each.

THE first of these two memoirs summarizes the available information relative to excessive short period rainfalls in Ceylon. For the great majority of stations twenty-four hourly readings only are available and from these it is shown that only a small part of the island has failed, during a period of at least 10 years' observations, to record at least one daily fall of 8 inches of rain. About half the island chiefly in the east and west coast districts has had a fall of 10 inches or more, a considerable area in the south-west and a small part of the east coast have experienced from 14 to 20 inches, and certain stations in the extreme north-east more than 30 inches. The Colombo automatic records for the 10 years 1904 to 1913 are treated in greater detail and the measured duration is given of all observed rainfalls exceeding ·50 inch per hour for intervals of ·40 inch upwards, including 302 instances. No month of the year was altogether free from such rainfalls, the most numerous and prolonged appearing to take place in the autumn. The most remarkable record quoted is undoubtedly the great fall of 6 inches in 73 minutes on July 12th, 1907. In this magazine for January, 1916, page 190, a reproduction of the pluviograph trace during this storm was given and provides an interesting comparison with the almost equally remarkable rainfalls of October 27th-28th, 1915, shown in the frontispiece of Vol. **50**, which, however, did not come within the scope of the memoir.

The second pamphlet gives summaries of the mean barometric readings for each month over various periods at nine stations, together with the appropriate corrections. These data include a few corrections of those already published in the annual reports and are specially arranged with a view to their utility for purposes of correlation.

RAINFALL TABLE FOR JANUARY, 1916.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH. Aver. 1875—1909. in.	1916. in.
		° ′	° ′			
Camden Square	*London*	51 32	0 8	111	1·83	1·30
Tenterden	*Kent*	51 4	*0 41	190	2·14	1·15
Arundel (Patching)	*Sussex*	50 51	0 27	130	2·59	1·47
Fordingbridge (Oaklands)	*Hampshire*	50 56	1 38	135	2·67	1·49
Oxford (Magdalen College)	*Oxfordshire*	51 45	1 15	186	1·78	1·37
Wellingborough (Swanspool)	*Northampton*	52 18	0 41	155	1·90	1·58
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	1·70	1·49
Geldeston [Beccles]	*Norfolk*	52 27	*1 31	38	1·53	1·50
Polapit Tamar [Launceston]	*Devon*	50 40	4 22	315	3·59	2·07
Rousdon [Lyme Regis]	,,	50 41	3 0	516	2·94	·98
Stroud (Field House)	*Gloucestershire*	51 44	2 13	226	2·33	1·73
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·51	1·39
Boston	*Lincolnshire*	52 58	0 1	11	1·54	1·05
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·70	·44
Mickleover Manor	*Derbyshire*	52 54	1 32	280	1·95	1·66
Macclesfield	*Cheshire*	53 15	2 7	501	2·66	1·64
Southport (Hesketh Park)	*Lancashire*	53 39	2 59	38	2·55	1·31
Arncliffe Vicarage	*Yorkshire, W.R.*	54 8	2 6	732	6·26	7·54
Goldsborough Hall	,, ,,	54 0	1 25	119	1·91	1·01
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	1·70	·59
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	1·90	1·04
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	13·44	22·80
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	3·65	3·50
Haverfordwest	*Pembroke*	51 48	4 58	90	4·69	3·09
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	3·91	3·31
Llandudno	*Carnarvon*	53 20	3 50	72	2·51	2·50
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	4·10	6·68
Marchmont House	*Berwick*	55 44	2 24	498	2·40	2·24
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	4·78	6·43
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	3·53	5·18
Islay (Eallabus)	*Argyll*	55 47	6 15	68	4·78	5·71
Mull (Quinish)	,,	56 34	6 13	35	5·55	5·89
Balquhidder (Stronvar)	*Perth*	56 21	4 23	422	8·74	14·79
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	2·01	1·84
Braemar	*Aberdeen*	57 0	3 24	1114	2·92	4·39
Aberdeen (Cranford)	,,	57 8	2 7	120	2·36	·91
Gordon Castle	*Moray*	57 37	3 5	107	1·99	2·09
Drumnadrochit	*E. Inverness*	57 20	4 29	138	3·63	7·10
Fort William	,, ,,	56 49	5 6	171	9·20	15·19
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	9·42	16·75
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·75	5·14
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	5·94	4·15
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	3·78	1·89
Nenagh (Castle Lough)	*Tipperary*	52 54	8 24	120	3·88	3·28
Ennistymon House	*Clare*	52 57	9 18	37	4·30	4·13
Gorey (Courtown House)	*Wexford*	52 40	6 13	80	3·19	1·47
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	3·15	2·02
Dublin (FitzWilliam Square)	*Dublin*	53 21	6 14	54	2·14	1·40
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	3·10	3·51
Crossmolina (Enniscoe)	*Mayo*	54 4	9 16	74	5·35	5·65
Cong (The Glebe)	,,	53 33	9 16	112	4·79	5·38
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	3·87	3·71
Seaforde	*Down*	54 19	5 50	180	3·41	2·30
Ballymena (Harryville)	*Antrim*	54 52	6 13	150	3·73	3·26
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	3·46	3·72

RAINFALL TABLE FOR JANUARY, 1916—*continued.*

RAINFALL OF MONTH (*con.*)					RAINFALL FROM JAN. 1.					
Diff. from Av. in.	% of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days	Aver. 1875—1909. in.	1916. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1875-1909. in.	STATION.
— ·53	71	·49	2	14	...	...	...	...	25·11	Camden Square
— ·99	54	·26	19	17	..	...	...	...	27·64	Tenterden
—1·12	57	·37	17	16	...	...	...	.	30·48	Patching
—1·18	56	·24	4, 17	19	...	...	..	...	31·06	Fordingbridge
— ·41	77	·54	2	12	...	...	...	...	24·58	Oxford
— ·32	83	·51	2	14	...	...	.	...	25·20	Swanspool
— ·21	88	·57	2	14	...	...	..	...	25·40	Westley
— ·03	98	·49	2	20	...	...	...	...	23·73	Geldeston
—1·52	58	·44	2	17	...	...	...	...	38·27	Polapit Tamar
—1·96	33	·17	1	13	...	...	...	...	33·54	Rousdon
— ·60	74	·40	2	15	..	..	...	...	29·81	Stroud
—1·12	55	·30	2	19	...	...	...	...	32·41	Wolstaston
— ·49	68	·27	4	16	...	..	..	...	23·35	Boston
—1·26	26	·12	2	11	...	..	...	...	24·46	Hodsock Priory
— ·29	85	·27	3	19	...	...	...	...	26·65	Mickleover
—1·02	62	·27	19	15	...	...	...	...	34·73	Macclesfield
—1·24	51	·21	6	16	...	...	...	...	32·70	Southport
+1·28	120	1·35	1	25	...	...	...		61·49	Arncliffe
— ·90	53	·40	1	10	...	...	...	...	27·29	Goldsborough Hall
—1·11	35	·11	19	11	...	...	...	...	26·42	Hull
— ·86	55	·30	26	18	..	...	...	...	27·94	Newcastle
+9·36	169	2·49	7	27	...	..	...	...	29·48	Seathwaite
— ·15	96	·95	2	24	...	...	...	...	142·28	Cardiff
—1·60	66	·47	17	19	...	...	...	...	46·81	Haverfordwest
— ·60	85	·33	17	26	...	...	...	...	45·46	Gogerddan
— ·01	100	·41	26	16	...	...	...	...	30·36	Llandudno
+2·58	163	·80	20	27	...	.	...	...	43·47	Cargen
— ·16	93	·50	26	14	...	...	...	...	33·76	Marchmont
+1·65	135	·82	2	31	...	...	...	...	49·77	Girvan
+1·65	147	·78	19	27	..	...	...	...	35·97	Glasgow
+ ·93	119	·61	2	29	.	...	...	...	48·79	Eallabus
+ ·34	106	·51	2	31	...	...	...	...	56·57	Quinish
+6·05	169	2·25	3	26	...	...	...	...	73·77	Stronvar
— ·17	92	·57	19	14	...	...	...	...	28·64	Dundee
+1·47	150	·69	19	21	...	...	...	...	34·93	Braemar
—1·45	39	·17	2	14	...	...	...	...	32·73	Aberdeen
+ ·10	105	·77	12	19	...	...	...	...	30·34	Gordon Castle
+3·47	198	·98	24	25	...	..	...	...	36·13	Drumnadrochit
+5·99	165	2·18	24	28	..	.	...	...	75·80	Fort William
+7·33	176	2·15	24	28	...	...	...	...	83·93	Bendamph
+2·39	187	·60	7	21	..		..	...	31·90	Dunrobin Castle
—1·79	70	·60	1	29	...	...	...	...	54·81	Killarney
—1·89	50	·29	28	21	...	...	...	...	39·57	Waterford
— ·60	85	·67	1	25	...	...	...	...	39·43	Castle Lough
— ·17	96	·43	6	28	...		...	...	46·52	Ennistymon
—1·72	46	·24	1	19	...	...	..	...	34·99	Courtown Ho.
—1·13	65	·34	1	27	...	.	...	...	35·92	Abbey Leix
— ·74	66	·26	21	16	..	..	...	...	27·68	Dublin
+ ·41	113	·48	19	28	...	...	...	...	36·15	Mullingar
+ ·30	106	·71	23	28	...	...	..	...	52·87	Enniscoe
+ ·59	112	·95	20	25	...	...	...	...	48·90	Cong
— ·16	96	·44	19	29		.	...	...	42·71	Markree
—1·11	68	·40	26	27	...	...	...	...	38·91	Seaforde
— ·47	87	·48	26	26	...	...	...	...	40·84	Ballymena
+ ·26	108	·38	23	27	...	.	...	...	39·38	Omagh

SUPPLEMENTARY RAINFALL, JANUARY, 1916.

Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road	1·94
,,	Ramsgate	·92
,,	Hailsham	1·68
,,	Totland Bay, Aston House	1·24
,,	Stockbridge, Ashley	1·17
,,	Grayshott	1·95
III.	Harrow Weald, Hill House	1·57
,,	Pitsford, Sedgebrook	1·49
,,	Woburn, Milton Bryant	1·51
,,	Chatteris, The Priory	·94
,,	Elsenham, Gaunts End	1·39
IV.	Shoeburyness	·75
,,	Colchester, Hill Ho., Lexden	·99
,,	Ipswich, Rookwood, Copdock	1·42
,,	Aylsham, Rippon Hall	1·88
,,	Swaffham	1·50
V.	Bishops Cannings	1·33
,,	Wimborne, St. John's Hill	2·03
,,	Ashburton, Druid House	2·93
,,	Cullompton	1·73
,,	Lynmouth, Rock House	3·19
,,	Okehampton, Oaklands	3·54
,,	Hartland Abbey	2·07
,,	Probus, Lamellyn	1·02
,,	North Cadbury Rectory	1·33
VI.	Clifton, Stoke Bishop	3·14
,,	Ross, The Graig	...
,,	Shifnal, Hatton Grange	·92
,,	Droitwich	·90
,,	Blockley, Upton Wold	1·61
VII.	Market Overton	1·64
,,	Market Rasen	·86
,,	Bawtry, Hesley Hall	·72
,,	Derby, Midland Railway	1·50
,,	Buxton	3·75
VIII.	Nantwich, Dorfold Hall	1·17
,,	Chatburn, Middlewood	4·34
,,	Lancaster, Strathspey	3·18
IX.	Langsett Moor, Up. Midhope	3·61
,,	Scarborough, Scalby	1·19
,,	Ingleby Greenhow	·69
,,	Mickleton	5·40
X.	Bellingham, High Green Manor	4·69
,,	Ilderton, Lilburn Cottage	2·16
,,	Thirlmere, The Bank	7·33
XI.	Llanfrechfa Grange	4·06
,,	Treherbert, Tyn-y-waun	12·41
,,	Carmarthen, The Friary	3·73
,,	Fishguard, Goodwick Station	2·60
,,	Crickhowell, Tal-y-maes	...
,,	New Radnor, Ednol	3·60
,,	Birmingham WW., Tyrmynydd	4·82
,,	Lake Vyrnwy	7·57
,,	Llangynhafal, Plâs Draw	1·55
,,	Dolgelly, Bryntirion	3·57
,,	Bettws-y-Coed, Tyn-y-bryn	5·84
,,	Lligwy	1·99

Div.	STATION.	Rain inches.
XI.	Douglas	2·99
XII.	Stoneykirk, Ardwell House	3·22
,,	Carsphairn Shiel	12·22
,,	Beattock, Kinnelhead	9·96
,,	Langholm, Drove Road	7·85
XIII.	Selkirk, The Hangingshaw	4·31
,,	North Berwick Reservoir	1·84
,,	Edinburgh, Royal Observaty.	2·80
XIV.	Maybole, Knockdon Farm	4·26
,,	Buchlyvie, The Manse	7·71
XV.	Ballachulish House	13·57
,,	Oban	6·86
,,	Campbeltown, Witchburn	4·95
,,	Holy Loch, Ardnadam	14·11
,,	Tiree, Cornaigmore	4·86
XVI.	Dollar Academy	5·70
,,	Glenlyon, Meggernie Castle	13·34
,,	Blair Atholl	4·52
,,	Coupar Angus	2·94
,,	Montrose, Sunnyside Asylum	·89
XVII.	Alford, Lynturk Manse	1·08
,,	Fyvie Castle	1·29
,,	Keith Station	1·39
XVIII.	Rothiemurchus	4·66
,,	Loch Quoich, Loan	44·05
,,	Skye, Dunvegan	9·30
,,	Lochmaddy, Bayhead	6·49
,,	Fortrose	3·16
,,	Glencarron Lodge	16·30
XIX.	Altnaharra	11·68
,,	Melvich	5·29
,,	Loch More, Achfary	14·34
XX.	Dunmanway, The Rectory	5·50
,,	Glanmire, Lota Lodge	2·30
,,	Mitchelstown Castle	2·53
,,	Darrynane Abbey	3·30
,,	Clonmel, Bruce Villa	1·49
,,	Newmarket-on-Fergus, Fenloe	2·92
XXI.	Enniscorthy, Ballyhyland	2·21
,,	Rothnen, Clonmannon	1·54
,,	Ballycumber, Moorock Lodge	2·24
,,	Balbriggan, Ardgillan	1·32
,,	Castle Forbes Gardens called Newtown Forbes	3·72
XXII.	Ballynahinch Castle	5·70
,,	Woodlawn	3·23
,,	Westport, St. Helens	4·80
,,	Dugort, Slievemore Hotel	8·62
XXIII.	Enniskillen, Portora	3·69
,,	Dartrey [Cootehill]	2·89
,,	Warrenpoint, Manor House	2·51
,,	Belfast, Cave Hill Road	3·13
,,	Glename Castle	3·76
,,	Londonderry, Creggan Res.	3·58
,,	Dunfanaghy, Horn Head	4·10
,,	Killybegs	6·03
,,		

THAMES VALLEY RAINFALL —— JANUARY, 1916.

Symons's Meteorological Magazine

Watershed of River Thames above Teddington, and River Lee above Feildes Weir

Rainfall Stations reporting
Isohyetals.

THE WEATHER OF JANUARY.

THE distribution of atmospheric pressure during January was abnormally constant, being characterized throughout by an unusually persistent anticyclone lying over the south-west of Europe, and a series of slowly moving depressions which travelled in an easterly or north-easterly direction in paths well to the north of the British Isles. The conditions were thus favourable for westerly winds which blew practically without intermission. The temperature was in all parts extremely high for the season, maximum readings of between 50° and 55° occurring with great frequency and minima below 40° being uncommon. The high temperature was most remarkable on account of its persistence, there being no interval of wintry weather. Except for very slight and brief touches in the second and fourth weeks there was no frost and there was practically no snow. The highest readings occurred during the first week, especially on the 1st and 6th. On the 1st the shade maximum at Camden Square reached 57°·2, or 0°·8 above the previous highest shade temperature recorded in January since the record was commenced in 1858.

The duration of bright sunshine was on the whole fairly normal, but the weather was cloudy in the north-west generally. The durations reported were as follows: Camden Square, 29·9 hours; Plumstead, 28·0 hours; Totland Bay, 46·2 hours; Ipswich, 62·8 hours; Sidmouth, 53·8 hours; Torquay, 50·4 hours; Ashbourne, 36·7 hours; Matlock Bath, 39·0 hours; Bolton, 17·4 hours; Southport, 39·5 hours; Hull, 21·3 hours; Haverfordwest, 47·8 hours; Swinton (Berwickshire), 35·5 hours; Paisley, 33·0 hours; Perth, 51·1 hours.

The distribution of rainfall during the month showed a close relationship to the prevailing wind and to the pressure conditions. In the south generally the month was dry, less than the average falling everywhere, except possibly on the Welsh hills. The rainfall was less than half the average on the south coast and in the south-east of Ireland. Little rain fell also in the English Midlands and on the east coasts of Great Britain and Ireland and less than half the average fell in parts of the north-east of England and of Scotland. The rainfall in the north-west of the British Isles was on the other hand, everywhere above the average, the excess being greatest in the north of Scotland and the West Highlands generally, where more than 50 per cent above the average fell. In the north-west of Ireland the excess was only slight. January is the month when the rainfall of the rainy western uplands is normally most pronouncedly in excess of that in the dry eastern districts, the month being the wettest of the year in the west of Scotland and nearly the driest in the English Midlands. This distribution was thus accentuated during January, 1916, and a very striking contrast between the east and west of the country resulted. The areas with more than 10 inches were unusually large, occupying most of the elevated districts in the west of Scotland, a considerable area in the northern Pennines and parts of Wales. In these districts rain fell nearly every day during the month. In western Inverness-shire, in the English Lake District, and in Snowdonia more than 20 inches fell, whilst records of more than 30 inches occurred at the head of Glenquoich and on the Stye. The very dry areas included a considerable part of Great Britain, less than an inch falling over most of the coast between Peterhead and the Wash, and also in detached areas in the centre and south of England. Over small parts of Yorkshire and Nottinghamshire less than ·50 in. fell. In Ireland the contrast was less marked, more than 10 in. falling only in the rainiest districts in the west and less than 2 inches on the coast from Dundalk Bay to Cork.

The general rainfall for England and Wales was 89 per cent. of the average; that for Scotland was 147 per cent.; for Ireland 86 per cent.; and for the British Isles as a whole 109 per cent.

Climatological Table for the British Empire, August, 1915.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Maximum. Date.	Minimum. Temp.	Minimum. Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	78·3	1	43·8	30	72·2	54·6	55·0	80	128·6	44·2	2·27	15	5·7
Malta	95·9	4	65·1	23	84·9	73·3	...	87	146·0	...	·41	3	0·8
Lagos	88·0	4	68·0	2	82·9	73·6	71·9	80	153·0	66·0	3·52	12	8·8
Cape Town	77·7	13	43·7	5	62·5	48·8	49·1	78	...	...	2·05	11	5·8
Natal, Durban ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Johannesburg	76·0	29	30·0	25	65·6	44·2	36·7	62	...	27·6	·19	1	2·5
Mauritius	76·9	30	54·0	22	75·0	59·5	56·7	70	...	45·7	·78	11	4·8
Bloemfontein	80·5	31	25·0	25	68·6	37·8	35·2	58	..	...	·04	1	1·2
Calcutta	93·5	13	77·2	19,31	89·8	80·0	78·6	85	...	73 6	15·91	17	8·8
Bombay ...	87·1	19	75·4	22	84·9	78·2	76·0	84	131·1	63·3	8·93	25	8·5
Madras	100·0	22	73·7	31	95·5	79·1	73·4	72	165·7	72·5	1·20	11	5·6
Colombo, Ceylon ...	86·4	26	73·5	31	85·2	77·2	74·3	83	153·7	70·1	·57	8	6·8
Hongkong	93·1	25	74·2	14	88·5	79·7	77·4	82	...	...	10 52	17	6·9
Sydney	70·9	15	43·0	31	63·0	48·5	42·7	61	116·9	31·3	1·24	8	3·3
Melbourne	66·2	21	36·0	19	58·0	45·7	43·9	72	115·6	28·0	2·14	21	6·7
Adelaide	69·8	21	37·9	29	61·5	46·8	46·6	76	127·2	28·5	2·53	17	4·8
Perth	75·0	17	40·0	21	63·9	50·2	48·4	72	134·0	33·0	7·47	23	5·9
Coolgardie	78·6	28	35·0	22	63·7	43·2	40·0	56	134·4	31·0	1·31	12	4·4
Hobart, Tasmania ..	62·2	26	32·1	31	55·3	42·6	40·0	70	116·7	23·2	1·33	22	6·3
Wellington ...	61·4	23	32·0	18	55·8	42·3	43·0	79	117·6	23·0	1·36	12	6·5
Auckland	63·0	23,24	38·5	1	58·7	47·9	47·9	82	122·0	35·0	4·02	16	5·9
Jamaica, Kingston .	93·5	3	71·6	17	90·1	74·6	72·7	80	...	...	6·24	8	5·2
Grenada	89·0	25	71·0	5	86·0	74·0	...	78	136·0	...	13·01	20	3·0
Toronto	87·5	16	40·2	31	74·4	58·1	58·9	82	142·0	37·8	8·14	16	5·1
Fredericton	85·5	1	36·0	28	73·7	53·7	57·8	81	...	...	3·57	12	5·9
St. John, N.B. ...	75·2	6	44·5	28	67·8	54·2	55·0	82	...	...	3·46	16	6·6
Alberta, Edmonton ...	86·0	10	44·9	23	78·7	53·9	...	72	139·2	34·5	3·25	8	3·6
Victoria, B.C.	87·9	21	48·9	24	70·1	53·9	52·0	72	139·3	44·0	·04	1	3·1

Johannesburg—Bright sunshine, 302·3 hours.

Mauritius—Mean temp. 1°·1 below, dew point 2°·5, and R 1·70 in., below averages. Mean hourly velocity of wind 12 miles.

COLOMBO, CEYLON—Mean temp. 81°·2, same as average, dew point 0°·7 above, and R 1·88 in. below, averages.

HONGKONG—Mean temp. 83°·5, mean hourly velocity of wind 8·9 miles. Bright sunshine 205·3 hours.

Melbourne—Mean temp. 0°·8 above, and R ·35 in. above, averages.

Adelaide—Mean temp. 0°·2 above, and R ·06 in. above, averages.

Coolgardie—Temp. 0°·3 below, and R ·25 in. above, averages.

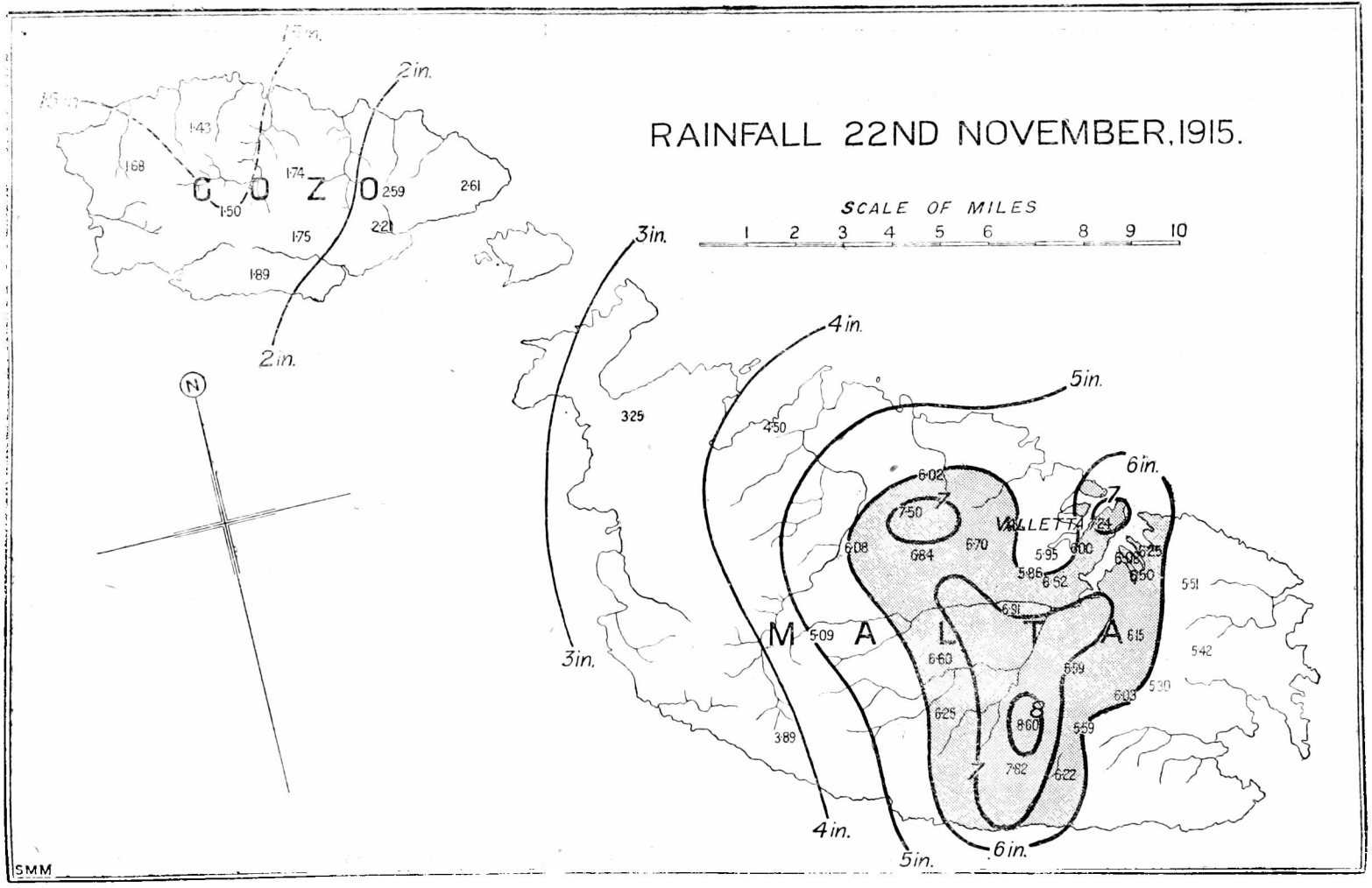
Hobart—Temp. 1°·0 above, and R ·48 in. below, averages.

Wellington—Mean temp 0°·6 above, and R 3·30 in. below, averages. Bright sunshine 134·5 hours. Frost on grass on 13 mornings.

JAMAICA, KINGSTON—On the 12th and 13th a hurricane swept over the N. side of the Island, sweeping away everything within its reach, wharves, houses, roads, bridges, and a part of the railway track, houses being carried ¼ mile away like canoes. The storm was similar to the one of August 11th, 1903.

THAMES VALLEY RAINFALL ——— FEBRUARY, 1916.

More than 4in.
4in.
5in.
6in.
Less than 4in.
ALTITUDE SCALE
Below 250 feet
250 to 500 feet
500 to 1000 feet
Above 1000 feet
SCALE OF MILES
0 5 10 15 20
WARWICK
WORCESTER
NORTHAMPTON
BEDFORD
CAMBRIDGE
SUFFOLK
GLOUCESTER
OXFORD
BUCKINGHAM
HERTFORD
ESSEX
MIDDLESEX
BERKSHIRE
WILTSHIRE
HAMPSHIRE
SURREY
KENT
COTTESWOLD HILLS
CHILTERN HILLS
WHITE HORSE HILLS
SALISBURY PLAIN
FOREST RIDGES
RIVER THAMES
Worcester
Evesham
Stratford on Avon
Warwick
Daventry
Towcester
Northampton
Bedford
Sharnbrook
Cambridge
Newmarket
Bury St. Edmunds
Sudbury
Haverhill
Shelford
Royston
Biggleswade
Ampthill
Woburn
Buckingham
Winslow
Hitchin
Throcking
Newport
Halstead
Colchester
Great Dunmow
Bishops Stortford
Bennington
Hertford
Hatfield
St. Albans
Berkhamsted
Tring
Aylesbury
Chesham
High Wycombe
Watford
Enfield
Potters Bar
Edgware
Harrow
Hendon
Camden Square
Ealing
Slough
Staines
Teddington
Kingston
Croydon
Epsom
Woking
Guildford
Dorking
Reigate
Godstone
Knockholt
Sevenoaks
Maidstone
Tunbridge Wells
Tenterden
Ashford
E. Grinstead
Horsham
Crowborough
Hastings
Rye
Winchester
Alton
Basingstoke
Andover
Salisbury
Stockbridge
Romsey
Southampton
Fareham
Portsmouth
Chichester
Arundel
Petworth
Midhurst
Guildford
Farnham
Aldershot
Basingstoke
Reading
Newbury
Hungerford
Marlborough
Swindon
Wantage
Abingdon
Faringdon
Oxford
Witney
Woodstock
Chipping Norton
Stow on the Wold
Cheltenham
Gloucester
Cirencester
Stroud
Tetbury
Malmesbury
Chippenham
Calne
Devizes
Trowbridge
Westbury
Frome
Warminster
Shrewton
Tisbury
Wimborne
Ringwood
Christchurch
Bournemouth
Poole
Dorchester
Weymouth
Lyme Regis
Axminster
Honiton
Exeter
Crediton
Okehampton
Launceston
Bodmin
Wadebridge
Camelford
Padstow
Newquay
Truro
Falmouth
Redruth
Penzance
Helston
St. Ives
Hayle
Camborne
Bude
Holsworthy
Torrington
Barnstaple
Ilfracombe
Lynton
Minehead
Taunton
Wellington
Chard
Bridport
Yeovil
Sherborne
Shaftesbury
Blandford
Wimborne
Ringwood
Lymington
Yarmouth
Newport
Ventnor
Sandown
Shanklin
Cowes
East Cowes
Ryde
Brighton
Hove
Worthing
Littlehampton
Bognor
Chichester
Arundel
Horsham
Dorking
Leatherhead
Kingston
Richmond
Hampton Court
Twickenham
Brentford
Chiswick
Hammersmith
Kensington
Chelsea
Westminster
City
Stepney
Poplar
Bow
Stratford
Leyton
Walthamstow
Tottenham
Edmonton
Enfield
Barnet
Hendon
Finchley
Hampstead
Highgate
Islington
Hackney
Shoreditch
Whitechapel
Bethnal Green
Mile End
Limehouse
Deptford
Greenwich
Woolwich
Plumstead
Erith
Crayford
Dartford
Gravesend
Rochester
Chatham
Sheerness
Faversham
Canterbury
Whitstable
Herne Bay
Margate
Ramsgate
Deal
Dover
Folkestone
Hythe
Romney
Rye
Hastings
Battle
Eastbourne
Seaford
Newhaven
Lewes
Uckfield
East Grinstead
Oxted
Caterham
Reigate
Redhill
Godstone
Tonbridge
Sevenoaks
Knockholt
Orpington
Bromley
Beckenham
Penge
Sydenham
Forest Hill
Lewisham
Blackheath
Greenwich
Woolwich
Plumstead
Erith
Crayford
Dartford
Gravesend
Rochester
Chatham
Maidstone
Ashford
Tenterden


RAINFALL 22ND NOVEMBER, 1915.
SCALE OF MILES
1 2 3 4 5 6 8 9 10
N
1·5 in.
2 in.
2 in.
1·43
1·68
1·50
1·74
2·59
2·61
1·75
2·21
1·89
3 in.
4 in.
5 in.
6 in.
3·25
4·50
6·02
7·50
6·08
6·84
6·70
5·95
6·00
6·08
6·25
5·85
6·52
6·50
5·51
6·91
M
5·09
A
L
T
A
6·15
5·42
6·60
6·59
6·03
5·30
6·25
8·60
5·59
3·89
7·82
6·22
VALLETTA
3 in.
4 in.
5 in.
6 in.

SMM